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AMERICAN CERAMIC COLORS OPEN NEW FIELD IN DESIGN

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A DISCUSSION OF RECENT IMPROVEMENTS IN AMERICAN CERAMIC COLORS AND THEIR INFLUENCE ON DESIGNS FOR DINNERWARE AND GLASS.

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FOREWORD

The artistic excellence of decorated dinnerware and glassware now manufactured in America is giving this country a new standing in the field of ceramics. Behind this growing vitality in design is an interesting story of recent developments in American Ceramic Colors which have enabled ceramic craftsmen to design for mass production without sacrificing beauty and permanence. The wide range of shades now obtainable, their brilliance, durability and the exact science of their control in firing, has opened up new possibilities of design not previously attainable.

As a leading manufacturer of American Ceramic Colors, the du Pont Company is constantly conducting research and experiments and cooperating with makers of ceramics, with resultant improvements in quality and adaptability to new uses. This bulletin presents some of the most outstanding developments which have influenced modern designs for dinnerware and glass and includes comments from well-known designers on present trends in American ceramics.

January, 1938

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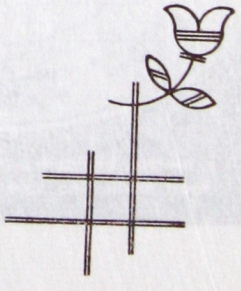
A Designer's View On American Ceramic Achievement

R. Guy Cowan, long known for the high quality of his ceramic designs, predicts that before many years have passed Europeans will come to America to study ceramics.

"Formerly, American artists were practically forced to finish their study abroad," says Mr. Cowan. "Now America is far ahead of the rest of the world in utilizing ceramic materials to add to the comforts and pleasures of living. We are ahead because America has had a Renaissance in art—in ability to design for mass production—and at the same time has built up the technical background essential to the making of new products. Important in this technical development is the part played by our chemical companies. We are no longer dependent on foreign sources for ceramic materials and particularly ceramic colors. We now have in this country sources which are more reliable and which produce at lower cost than those abroad. All this has come about in the past twenty years. And because our life and background in this country are so dissimilar to that of the Old World, our art—which after all is a reflection of life itself—is of necessity developing a character of its own."

"One of the most important factors in furthering this art growth," he adds, "is that our people no longer worship a product because it is imported."



Reflecting the primitive American spirit, Indian Corn is reproduced in three-dimensional effect with American Ceramic Colors that portray unusual depth of tone.

The rich ox blood of early Chinese porcelain is duplicated in this pottery with American colors and a special glaze, the first reproduction here of this rare shade.

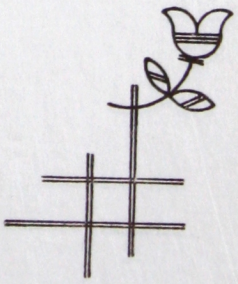
The red flamingo pattern of this dinnerware stands out brilliantly on a cream body, lending vivid accent to the table setting.

Traditional in design but modern in color, a dignified pattern is relieved by permanent brightness of the blue and silver treatment on a white ground.

American Ceramic Colors Open New Field In Design

Modern American china and glass is adding a brand new picture to the colorful panorama of beautiful ceramic objects which spreads back to prehistoric times. The mellowed richness of relics from ancient China, Persia and early European civilizations has given us deep reverence for the skill and technique of the old-time potters and glass blowers. Examples from later periods of ceramic production, such as fine Chelsea and Sevres, are also highly prized for their artistic excellence. Yet, with all their beauty of color and texture, these products of older civilizations are now being challenged in our own country by recent chemical developments which have brought qualities of tone and luster once unattainable.

Here in America, chemists have been studying ceramic colors through every phase of their production, with outstanding results in brilliance, variations of shade and permanence. Through continued research and constant alertness to industrial progress, new sources of color material have been found, scientific heat control has reduced spoilage in firing, and more efficient methods of manufacture have permitted the use of expensive colors. Hence we have today an almost unlimited range of permanent shades which is widening the field of design and raising the artistic standard of moderately priced china and glass.



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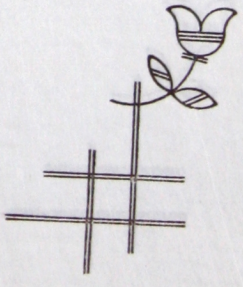
Modern Chemistry Brings Color Control

The early ceramic craftsmen knew little about chemistry. They mixed beautiful colors but they had no notion why these mixtures produced certain shades. Consequently, they found it difficult to duplicate a color tone exactly and develop matching pieces. But the modern chemist has made an exact science of ceramic color manufacture. He makes hundreds of combinations with one group of elements, varying the proportions in each case, to find which mixture gives the strongest and purest color. He also experiments with different degrees of heat, as some elements respond best to a low heat and others to a high temperature. Thus he is able to tell exactly how his final formula is going to work, and the china or glass manufacturer who orders a specific shade can be sure that it will remain the same no matter how many times the order is repeated. Also, the home-maker who buys dinnerware or glass of this color can count on a perfect match if she wants to add to the set later on.

Research and Experiment Widen Range of Shades

In ancient days, color materials were limited to common elements. The craftsmen of those times had cobalt, copper, chromium, lead, quartz, lime and zinc, and also arsenic, iron and soda. But many of the elements which are now used for ceramic colors have entered the field only within the last few years. Vanadium, for instance,



Glassware colored to simulate china is now available at moderate prices, through the development of super-resistant glass colors. Solid yellow, blue, red and green are used here.

A decorative treatment of glassware giving the effect of bright-patterned earthenware. The super-resistant colors withstand contact with acids and alkaline detergents.

Floral designs on contemporary dinnerware depart from the old-fashioned nondescript sprays, as the wide range of brilliant American colors permits variegated accents like this tropical bouquet.

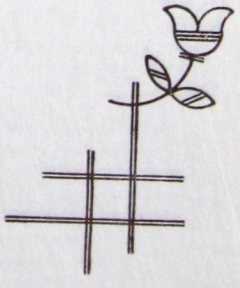
Conventional banding gains distinction from its deep blue tone, heightened by outlining of gold, and set off by the creamy color of the body.

these elements, retaining their original brightness under hard daily use. For a new type of glass dinnerware which looks like china, super-resistant colors are being used to withstand the extra service not required of drinking glasses and the usual pieces of colored glassware.

The development of transparent colors brought a new effect for bright-banded tumblers. Previously these bands had to be opaque, but by patient research with old elements and by trying them in different proportions, color manufacturers have created vivid shades that are as transparent as the glass itself. When applied in a series of bands, these colors have a clear brilliance as the light shines through.

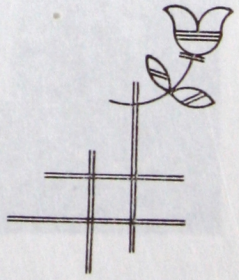
Today's Craftsmen Rely Less on Tradition

Such developments as these mark a new attitude toward ceramics that is far removed from over-emphasis on tradition which was the guiding spirit of the early craftsmen. It was then a matter of pride to follow methods which had been handed down from father to son and remained a family secret for generations. While this carefully guarded inheritance produced rare beauty, it discouraged new ventures, so that for centuries there were few actual advancements in ceramic knowledge. It is undoubtedly true, too, that some of the finest museum pieces were accidents, in a sense. Out of many pieces that went into the kiln in those days, only a few might emerge with real beauty of color—so little was known of the science of heat control. Waste and spoilage was unavoidable, and only the wealthy people were able to afford handsome pottery.



Laboratory Tests Assure Color Satisfaction

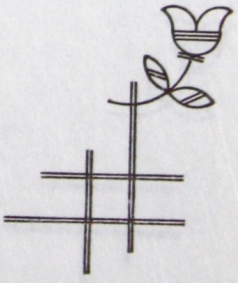
One of the greatest advancements of the present age of ceramics is the close cooperation between color manufacturers and the makers of china and glassware. In the ceramic color plant of the du Pont Company, in Perth Amboy, N. J., at least 10,000 matching colors can be developed, and about 700 new colors are made every year. Thousands of samples of standard colors are kept on hand in powder form or applied to different types of ceramic materials, such as porcelain blocks, small glass jars, and even terra cotta, cast iron, brick and bathroom fittings. An important part of the plant is the service laboratory which is equipped to duplicate on a small scale every operation that will take place when the colors are finally applied in the factory. The mechanical operations which have replaced the old-time hand processes are all reproduced here. There are electrically heated ovens for firing, booths for spraying colors by compressed air, silk screen stencils for printing one to five colors in a variety of patterns, and decalcomania transfers — a much-used method by which intricate designs are first put on paper and then transferred to china. A color detecting machine reveals fine gradations of shade not visible to the naked eye and is particularly helpful in distinguishing different tones of white. With such careful check-up, each color meets the specific needs for which it is ordered and better effects are assured.



American Designers Inspired by New Developments

For designers of ceramic decorations, these improvements in American Ceramic Colors have brought a new means of expression, making possible new patterns that were beyond the limited range and uncertain effects of the old colors. Simple yet distinctive designs that owe their attraction to richness of color are replacing more elaborate but nondescript forms. "Too much decoration distorts dinnerware," says Viktor Schreckengost, one of the leading designers of modern pieces. "Decoration should merely enhance, enrich or give variety." His designs are a decided departure from conventional treatments, embodying popular subjects but in simpler style and more brilliant shades.

Keeping pace with the modern trend toward furniture of blonde woods and restrained lines, colorful dinnerware is now obtainable in any desired shade to supply the needed accent that relieves the room from coldness and monotony. The permanence of the colors has brought a new artistic achievement in their adaptability to overglaze patterns. Before the arrival of American colors, lasting shades—formerly available only on expensive European china—owed their permanence to a protective glaze coating which is likely to tone down the brilliance. Now, this coating is not essential for protection, as present day colors are relatively unaffected by frequent washing or contact with acids. Applied over the glaze, they retain full color value and better uniformity of tone.



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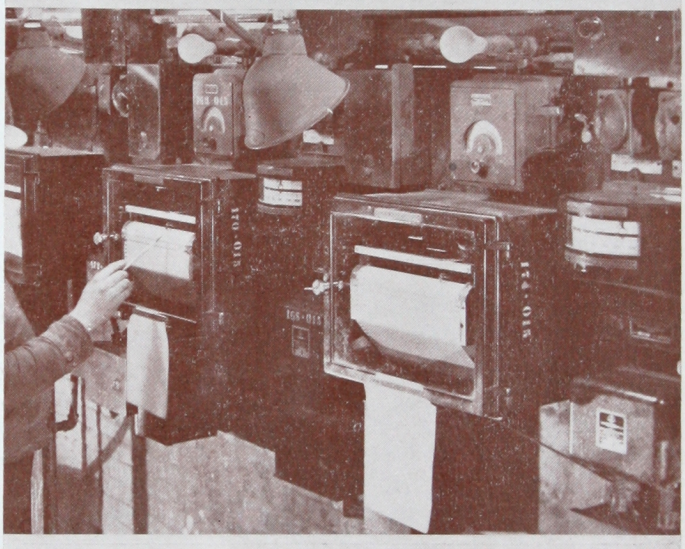
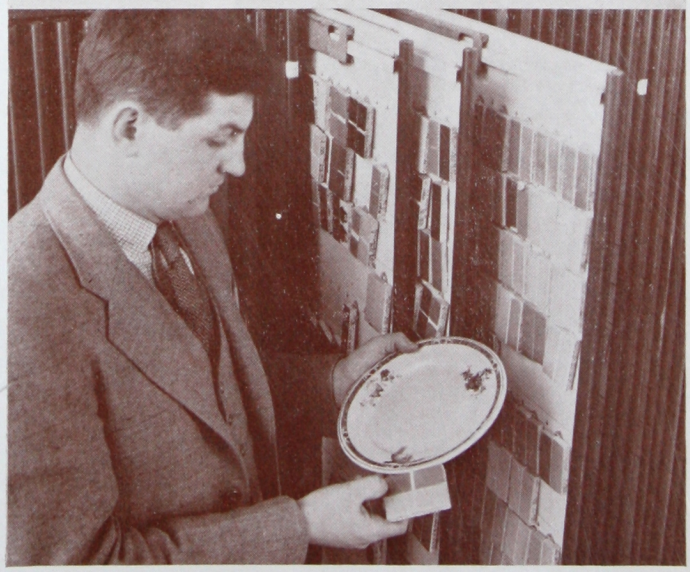
Photographs of modern machinery used in two of the color-making processes at the du Pont plant lend dramatic interest to the industrial side of ceramic color progress. Above, a grinding mill with rotating porcelain balls that pulverize the flux—the glass component of ceramic colors. Center, a series of pyrometers register the exact temperature of every kiln, permitting scientific control. Other operations of color manufacture are described on the following page. The third illustration pictures a filing cabinet with fired samples of standard colors, which facilitates matching of any shade of color submitted.





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HOW AMERICAN CERAMIC COLORS ARE MADE

Components

The body which gives the color consists of a combination of dry pigments, according to the color desired.

The flux gives the finish. It is composed of clear ground glass slightly pigmented, having the appearance of fine powder.

Body and flux are blended for glass colors and for overglaze colors on china. Body is used without flux for underglaze colors on china.

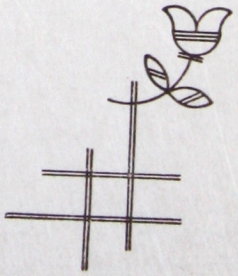
Firing, an Exact Science

The mixture is fired in the kiln to reduce all the materials to a form that will give the required shade of color. The heat produces new chemical compounds through fusion and elimination, and the body comes out in a solid mass. The temperature of the kiln is determined by double control—not only by pyrometers but by testing with a number of small cones so arranged that each one bends over at a different degree of heat. The body must then be ground to a proper degree of fineness, when it is ready for mixing with the flux.

Grinding The Flux

After firing, the flux becomes a molten mass and is immersed in water, which shatters it and brings it to a consistency that can be readily ground. It is then dried out in huge kettles and placed in a grinding apparatus, where it is pulverized with a constantly rotating pile of small porcelain balls which at the same time pound the body color into the flux. It takes from eight hours to two or three days to grind the color sufficiently, depending upon the hardness of the materials in the mixture.

This process completes the main operations and, after drying and sifting, the color is ready for use in decoration.



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